TWO NEW SPECIES OF *PLATYBAETIS* (EPHEMEROPTERA, BAETIDAE) FROM SULAWESI, INDONESIA[1]

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ABSTRACT: Two new species of *Platybaetis* (Ephemeroptera: Baetidae), *P. sulawesiensis* and *P. wallacei*, are described from Sulawesi, Indonesia. Larvae of *P. sulawesiensis* can be distinguished from all other species of *Platybaetis* by gills 2-7 each with numerous short, robust, simple setae near anterolateral margin of gill. Larvae of *P. wallacei* most closely resemble *P. edmundsi* morphologically, but can be differentiated from the latter by presence of hindwing-pads; terga 1-10 with broad, rounded posterior marginal spines; and terminal filament reduced to 1 segment that is approximately 2.5 times as long as the width at the base.

The genus *Platybaetis* established by Müller-Liebenau (1980a) from the Philippines is a small genus with only four species so far described: *P. edmundsi* from the Philippines and *P. uenoi* from Nepal (both Müller-Liebenau, 1980a), *P. bishopi* from West Malaysia (Müller-Liebenau, 1980b) and *P. probus* from East Malaysia (Müller-Liebenau, 1984). During the Royal Entomological Society Project Wallace Expedition to Sulawesi, Indonesia in 1985, two undescribed species of the genus *Platybaetis* were collected by one of us (DD). The two new species are described below.

Abbreviations used for collection localities, collectors, and deposition of types are: Sulawesi Utara Province (SUP), Dumoga-Bone National Park (DBNP); David Dudgeon (DD); Purdue Entomological Research Collection, West Lafayette, Indiana (PERC); Florida A & M University, Tallahassee, Florida (FAMU); Department of Ecology & Biodiversity, University of Hong Kong (HKU); and, the Insect Collection of South China Agricultural University, Guangzhou, P. R. China (SCAU).

Platybaetis sulawesiensis NEW SPECIES

(Figs. 1 and 3)

Larva. Body length (full grown specimens): 8.0-12.5 mm (female), 7.2-9.0 mm (male); cerci: 10.3-15.6 mm (female), 7.0-10.5 mm (male); terminal filament (Fig. 1g) reduced to 1 segment, approximately 0.1 mm.

Head: Flattened and subquadrangular, slightly wider than long; coloration yellow-brown, with irregular pale brown markings between eyes on vertex; head of female larva with notch in posterior margin, but very shallow emargenation in male. Antennae pale yellow, thick and short, slightly longer than width of head; scape nearly as broad as long, pedicel cylindrical, approximately 1.3-2.0 times longer than broad; flagellum with approximately 20 segments. Labrum nearly rectangular, approximately 2.0 times wider than long; dorsum with 1+6 (7) long, simple

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submarginal setae; labrum directed ventrally. Hypopharynx as in Figure 1e. Left mandible (Fig. 1b) with incisors with 6 to 7 denticles, molar area with stout, thumb like apical prolongation, approximately 2.0 times longer than wide. Right mandible (Fig. 1b) with incisors with 6 to 7 denticles. Maxillae (Fig. 1d) with 5-7 long, fine, simple setae on medial hump; palps 3-segmented, division between segment 1 and segment 2 indistinct; terminal segment nearly as long as proximal two segments, with small apical tip at apex. Labium (Fig. 1i) with glossae slightly longer than paraglossae, glossae slightly narrower than paraglossae; paraglossae approximately 2.0 times longer than broad; glossa with two large, stout, blunt setae near apex; apex of paraglossa with single row of seven long, robust, clavate setae (Fig. 1i); palps 3-segmented; terminal segment with numerous stout, acute setae.

Thorax: Coloration yellow-brown. Pronotum approximately as broad as head capsule in female, slightly narrower than head capsule in male; pronotum posterolateral margin of rounded. Hindwingpads (Fig. 1c) absent or vestigial. Legs paler than thorax, with single row of long, pinnate setae along dorsal margin of femora; similar row of less robust but denser setae present on dorsal margins of tibiae and tarsi; submarginal setae along the dorsal margin of femora stout and conical (Fig. 3); all submarginal setae approximately same length as distance between bases of long setae; tarsal claw with single row of denticles, denticle near apex longest (Fig. 1h).

Abdomen: Coloration yellow-brown; terga 2-9 each with two pairs of brown markings medially, anterior pair rodlike and divergent posteriorly, posterior pair shorter and smaller than anterior one; terga 1 and 10 without such markings. Terga 1-10 each with long, acute posterior marginal spines (Fig. 1f). Gills (Fig. 1a) simple and rather large; lamellae with dark brown and strongly ramified tracheae; gills 2-7 each with numerous short, robust, simple setae near anterolateral margin. Paraprocts similar to Figure 2d. Cerci longer than body, fringed with short hairs medially; terminal filament reduced to 1 segment.

Adult: Unknown.

Material Examined. Holotype: Mature male larva, INDONESIA, Sulawesi, SUP, DBNP, Tumpah River above the confluence with Toraut River, 2-VIII-1985. DD. Paratypes: 70 larvae, locality and date as holotype; 16 larvae, SUP, DBNP, Waterfall creek (tributary of Tumpah River), 5-VIII-1985, DD; 28 larvae, SUP, DBNP, upper Tumpah River, 1-VIII-1985, DD; 90 larvae, SUP, DBNP, lower confluence of Tumpah River and Toraut River, 8-VIII-1985, DD; 48 larvae, SUP, Irrigation Canal, downstream of the Tumpah-Toraut confluence, 10-VIII-1985, DD; 36 larvae, SUP, Irrigation Ditch, downstream of the Tumpah-Toraut confluence, 10-VIII-1985, DD; 10 larvae, SUP, DBNP, Toraut River above confluence with Tumpah River, DBNP, 15-VIII-1985, DD; 32 larvae, SUP, Agricultural Stream (tributary of Toraut River below Weir), near DBNP, 12-VIII-1985, DD. All types are in alcohol. Types are deposited in the following collections: holotype and 20 paratypes in PERC, 15 paratypes in FAMU, 30 paratypes in SCAU, the remaining paratypes in HKU.

Etymology. The specific epithet refers to the island of Sulawesi where the type locality is situated.

Remarks. The larva of *P. sulawesiensis* can be distinguished from all other species of *Platybaetis* by the following combination of characters: (1) gills 2-7 each with numerous short, robust, simple setae near anterolateral margin of gill; (2) terga 1-10 each with long, acute posterior marginal spines; (3) length of submarginal setae on femora approximately same length distance between bases of long marginal setae; and (4) terminal filament reduced to one segment.

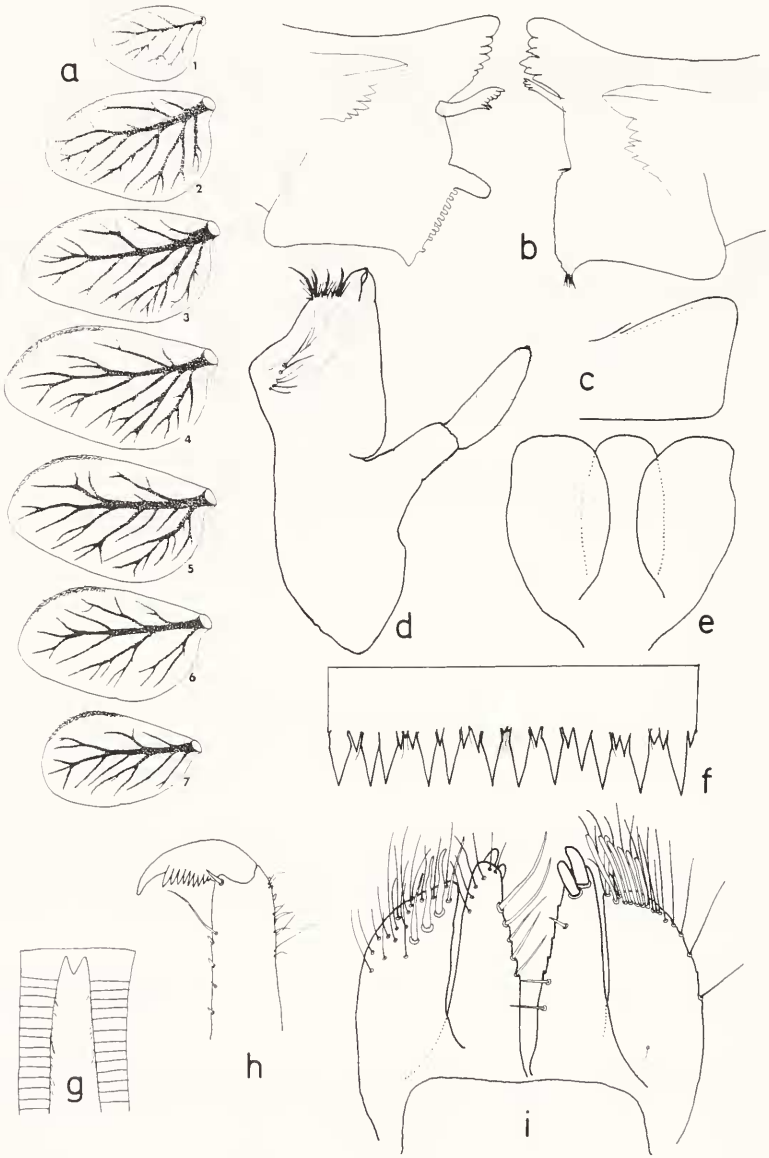

Fig. 1. Larva of *Platybaetis sulawesiensis* n. sp.
a) gills I to VII; b) canini and molar area of left and right mandibles; c) right half of metatergum, which lacks hindwing pads; d) maxilla; e) hypopharynx; f) posterior margin of tergum VI; g) base of cerci; h) apex of tarsus with long bristle; i) glossa and paraglossa, left: ventral view, right: dorsal view.

The new species lives on stone surfaces in moderate to swift current. The altitude of collection localities was approximately 210m.

Platybaetis wallacei NEW SPECIES

(Figs. 2, 4-6)

Larva. Body length: 7.7-8.8 mm (female), 7.2-8.2 mm (male); cerci broken in both sexes in material examined; terminal filament (Fig. 2h and 4) reduce to 1 segment, approximately 0.25 mm in length.

Head: Coloration yellow to pale brown; head nearly quadrangular, with irregular pale brown markings on vertex; head of female with distinct notch in middle of hind margin; male with shallow incision. Antennae pale yellow, shorter than head; scape slightly wider than long; pedicel cylindrical, approximately 1.3 times longer than broad; flagellum with approximately 20 segments. Labrum nearly oblong, approximately 2.0 times wider than long; dorsum with 1+6 long, robust, simple submarginal setae. Left mandible (Fig. 2a) with incisors with 6 to 7 denticles, molar area with large, stout, thumblike protrusion, approximately 2.0 times longer than wide. Right mandible (Fig. 2a) with incisor with 6 denticles. Maxillae (Fig. 2c) with four long, fine, simple setae on medial hump; palps 3-segmented, articulation of proximal two segments indistinct; terminal segment slightly longer than proximal two segments. Hypopharynx as in Figure 2b. Labium (Fig. 2f) with glossae slightly longer than paraglossae; glossa with two large stout, blunt setae near apex; apical margin of paraglossa with single row of seven long, robust, clavate setae (Fig. 2f); palps 3-segmented, 3rd segment with numerous stout, acute setae.

Thorax: Coloration pale yellow-brown. Pronotum nearly as broad as head capsule; pronotal posterolateral margin of rounded. Hindwing-pads minute and narrow (Fig. 2g). Legs paler than thorax. Dorsal margin of femora with regular dense row of long, robust setae fringed with fine feathered hairs; similar setae on dorsal margins of tibiae and tarsi, less robust and much denser than on femora; several broad, flat, truncate submarginal setae near dorsal margin of femora, approximately half as long as distance between bases of long marginal setae (Fig. 5, 6); tarsal claw with single row of denticles, denticle near apex longest.

Abdomen: Coloration pale yellow-brown; terga 2-9 with two pairs of brown markings medially, anterior pair rod-like, divergent posteriorly, posterior pair shorter and smaller than anterior pair; terga 1 and 10 without such markings. Terga 1-10 with broad, rounded posterior marginal spines (Fig. 2i). Gills (Fig 2e) with distinct dark brown branched tracheae toward hind margins; gill margins smooth, with few fine hairs. Paraprocts as in Figure 2d. Cerci medially fringed with short hairs; terminal filament reduced to single segment approximately 2.5 times as long as width at base.

Adult : Unknown.

Material Examined. Holotype: Mature larva, INDONESIA, Sulawesi, SUP, Irrigation Canal, downstream of the Tumpah-Toraut confluence; 10-VIII-1985; David Dudgeon. Paratypes: 2 larva, SUP, DBNP, upper Tumpah River, 1-VIII-1985, DD; 3 larvae, SUP, DBNP, Tumpah River above the confluence with Toraut River 2-VIII-1985, DD; 6 larvae, SUP, DBNP, Waterfall creek (tributary of Tumpah River), 5-VIII-1985, DD; 3 larvae, SUP, DBNP, lower confluence of Tumpah River and Toraut River, 8-VIII-1985, DD; 2 larvae, SUP, Irrigation Ditch, downstream of the Tumpah-Toraut confluence, 10-VIII-1985, DD. All types are in alcohol. Types are deposited in the following collections: holotype and 3 paratypes in PERC, 3 paratypes in FAMU, 4 paratypes in SCAU, and 5 paratypes in HKU.

Etymology. This species is named after Alfred Russel Wallace.

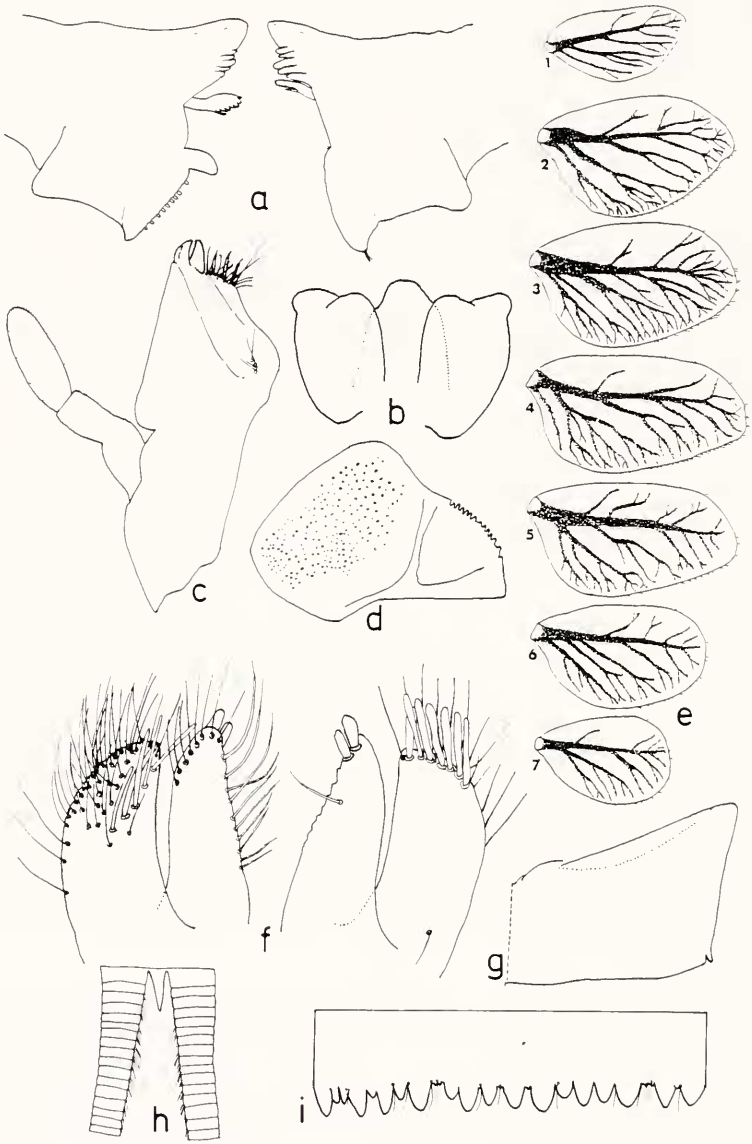

Fig. 2. Larva of *Platybaetis wallacei* n. sp.
a) canini and molar area of left and right mandibles; b) hypopharynx; c) maxilla; d) paraproct; e) gills I to VII; f) glossa and paraglossa, left: ventral view, right: dorsal view; g) right half of metatergum bearing hindwing pads; h) base of cerci; i) posterior margin of tergum VI.

Remarks. The larva of *P. wallacei* is morphologically very similar to *Platybaetis edmundsi* Müller-Liebenau, but can be differentiated from it by the following combination of characters: (1) presence of hindwingpads; (2) terga 1-10 with broad, rounded posterior marginal spines; and (3) terminal filament in both sexes reduced to 1 segment and approximately 2.5 times as long as the width at the base.

Larvae of *P. edmundsi* were collected in the Philippines highlands between 1,600-2,200 m (Müller-Liebenau, 1980a); *P. wallacei*, however, occurred at a lower altitude (210 m) in Sulawesi. *Platybaetis sulawesiensis* and *P. wallacei* were found together in Sulawesi streams, but *P. sulawesiensis* was predominant.

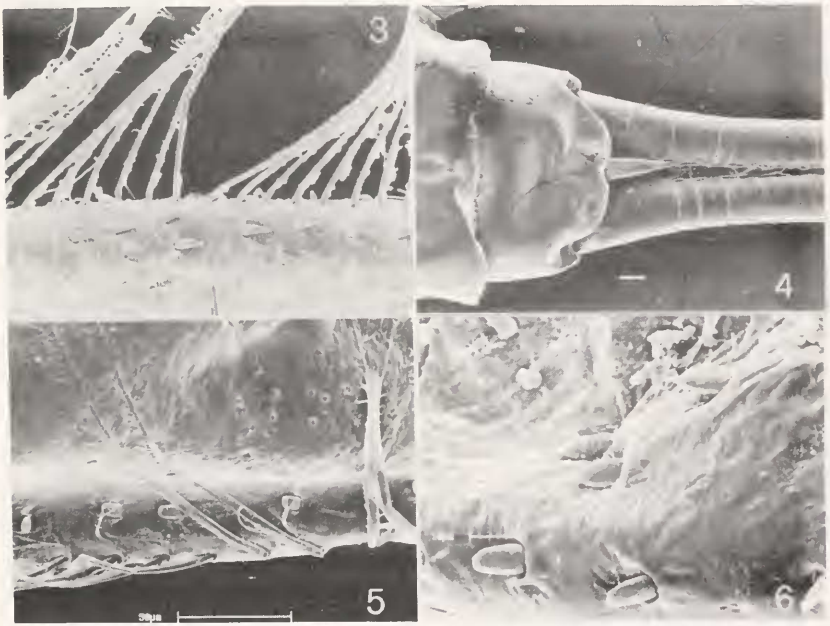

Fig. 3. *Platybaetis sulawesiensis* n. sp.: section of outer margin of femur with long marginal setae and stout, conical submarginal setae (note submarginal setae which are nearly the same length as the distance between the bases of the long marginal setae).
Fig. 4. Base of cerci of *Platybaetis wallacei* n. sp. (scale: 60 mm)
Fig. 5. *Platybaetis wallacei* n. sp.: section of outer margin of femur with long marginal setae and short, truncated submarginal setae which are about half as long as the distance between the bases of the long marginal setae.
Fig. 6 *Platybaetis wallacei* n. sp.: details of submarginal setae on outer margin of femur.

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